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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/450,514	11/30/1999	KOICHI SATO	P18408	7714

7055 7590 11/19/2003

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EXAMINER

HANNETT, JAMES M

ART UNIT	PAPER NUMBER
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2612

DATE MAILED: 11/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/450,514

Applicant(s)

SATO, KOICHI

Examiner

James M Hannett

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 November 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other: ____

DETAILED ACTION

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Image reading device wherein pixel data is first thinned out and then subjected to an interpolation process.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1: Claim 10 is rejected under 35 U.S.C. 102(e) as being anticipated by USPN 6,593,965

Miyamoto.

2: In regards to Claim 10, Miyamoto teaches an image reading device in which pixel data of a first image, formed on an imaging device having an on-chip color filter of a plurality of colors, are point-sequentially read from the imaging device (Column 2, Lines 11-17). And subjected to an interpolation process (Column 4, Lines 12-20) to generate components of the plurality of colors for each of the pixel data to obtain a second image, the image reading device comprising:

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A thinning processor (Figure 3 and Column 3, Lines 57-60) that thins out some of the pixel data before the pixel data are subjected to the interpolation process, so that the second image is composed of a smaller number of pixels than the first image.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3: Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 6,593,965 Miyamoto in view of USPN 5,900,623 Tsang et al.

4: As for Claim 1, Miyamoto teaches an image reading device comprising:

An imaging device that has pixels and color filters provided on said imaging device, said color filter having color filter elements of a plurality of colors (Figure 3), said pixels generating an original image data containing pixel data, each of which corresponds to one of said colors which are arranged in a predetermined distribution; A reading processor that reads said pixel data from said imaging device; Column 2, Lines 11-17. A thinning processor that thins out some of said pixel data to generate a thinned image data, colors of which are arranged in said predetermined distribution; Figure 3 and Column 3, Lines 57-60 and An interpolation processor that performs an interpolation process on said thinned image data to generate an interpolated image data for each of said colors; Column 4, Lines 12-20.

Miyamoto does not teach an imaging device that has photo-diodes rather states that the imaging device is a CCD image sensor.

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Tsang et al depicts in Figure 4 and teaches on Columns 4 and 5, Lines 60-67 and Lines 1-4 the use of an image sensor that uses photo-diodes for generating image data. Tsang et al teaches that it is advantageous to use photo-diodes because they provide superior quantum efficiency.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the photo-diode image sensor array configuration of Tsang et al for the image sensor of Miyamoto in order to provide superior quantum efficiency.

5: In regards to Claim 2, Miyamoto teaches on Column 3, lines 57-63 and depicts in Figure 3 wherein said colors of said original image data are arranged in such a manner that a $(m \times m)$ matrix, formed by said plurality of colors, is repeated, and said thinning processor thins out $(m \times (n-1))$ number of pixel data for every $(m \times n)$ number of pixel data in a horizontal direction and a vertical direction of an image corresponding to said original image data, wherein each of “m” and “n” is a positive integer greater than 1. The examiner has viewed $m = 2$ and $n = 2$, therefore there is a (2×2) matrix which contains two green pixels one red pixel and one blue pixel. And the system thins out 2 pixel data for every 4 pixel data.

6: As for Claim 3, Miyamoto teaches on Column 3, lines 57-63 and depicts in Figure 3 wherein the colors of the original image data are arranged in such a manner that a (2×2) matrix, formed by said plurality of colors, is repeated, and said thinning processor thins out $(2 \times (n-1)) = 2$ number of pixel data for every $(2 \times n) = 4$ number of pixel data in a horizontal direction and a vertical direction of an image corresponding to the original image data. The examiner has viewed $n = 2$, therefore there is a (2×2) matrix which contains two green pixels one red pixel and one blue pixel. And the system thins out 2 pixel data for every 4 pixel data.

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7: In regards to Claim 4, Miyamoto teaches on Column 5, Lines 59-63 that the ratio for image reduction is not limited to 1:2, and that by changing the number of pixels between neighboring pixel blocks, other corresponding ratios can be used.

However, Miyamoto does not specifically state that the thinning processor thins out 2 pixel data for every 3 pixel data. However, Official Notice is taken that it was well known in the art at the time the invention was made for display screens to be different sizes which would require a thinning process to thin out 2 pixel data for every 3 pixel data, in order to enable a system to display image data on display screens that have less resolution than the image sensor.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to enable the system of Miyamoto to use a reduction ratio in which the thinning processor thins out 2 pixel data for every 3 pixel in order to enable the system to display the image data on a display screen that had one third the resolution of the image sensor.

8: As for Claim 5, Miyamoto teaches on Column 5, Lines 59-63 that the ratio for image reduction is not limited to 1:2, and that by changing the number of pixels between neighboring pixel blocks, other corresponding ratios can be used.

However, Miyamoto does not specifically state that the thinning processor thins out 2 pixel data for every 3 pixel data. However, Official Notice is taken that it was well known in the art at the time the invention was made for display screens to be different sizes which would require a thinning process to thin out 4 pixel data for every 5 pixel data, in order to enable a system to display image data on display screens that have less resolution than the image sensor.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to enable the system of Miyamoto to use a reduction ratio in which the

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thinning processor thins out 4 pixel data for every 5 pixel data in order to enable the system to display the image data on a display screen that had one fifth the resolution of the image sensor.

9: In regards to Claim 6, Miyamoto depicts in Figure 3 that the colors of the color filter elements are arranged in the Bayer arrangement.

10: As for Claim 7, Miyamoto depicts in Figure 3 that the color filter has red filter elements, green filter elements and blue filter elements, and in the (2 x 2) matrix, the green filter elements are positioned on a diagonal line, and the red filter element and the blue filter element are positioned on another diagonal line.

11: In regards to Claim 8, Miyamoto teaches on Column 5, Lines 59-63 that the ratio for image reduction is not limited to 1:2, and that by changing the number of pixels between neighboring pixel blocks, other corresponding ratios can be used. Therefore, the reduction ratio is set in accordance with which the number of pixel data thinned out by the thinned processor.

12: As for Claim 9, Miyamoto teaches on Column 5, Lines 64-67 a reduced image indicating processor that forms a color image based on the interpolated image data and indicates the color image. Miyamoto teaches that the reduced or thinned image is interpolated and sent to the video memory and is then displayed on an LCD. This is viewed by the examiner as forming a color image based on the interpolated image data and indicates the color image.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USPN 6,201,571 Ota teaches the use of a digital camera that performs line thinning and a synthesis process; USPN 6,002,429 Ochi et al teaches the use of an imaging device that can perform both line thinning and interpolation; USPN 6,091,513 Ishihara et al teaches the use

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of an imaging device that can perform a reduction process; USPN 5,038,202 Ooishi et al teaches the use of an image transformation system; USPN 6,546,130 Inoue et al teaches the use of a digital camera that can perform a line thinning operation before a interpolation operation..

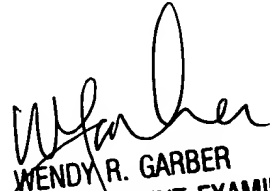
Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M Hannett whose telephone number is 703-305-7880. The examiner can normally be reached on 8:00 am to 5:00 pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy Garber can be reached on 703-305-4929. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to customer service whose telephone number is 703-308-6789.

James Hannett
Examiner
Art Unit 2612

JMH
October 30, 2003


WENDY R. GARBER
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